Trends, Prevalence and Outcomes of Mixing Components from Different Manufacturers in Total Hip Arthroplasty: An Analysis of the AJRR

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INTRODUCTION: Implant components in primary total hip arthroplasty (THA) continue to evolve. As such, there is the option to combine femoral and acetabular components from different manufacturers. However, the prevalence of mixing components from different manufacturers in THA remains unknown, as do the factors that might be driving this decision and whether there are any measurable effects of implant survival.

METHODS:

The American Joint Replacement Registry (AJRR) was used to select patients 65 years or older who underwent primary THA between January 2012 and December of 2021 with minimum 2-year follow-up to create a retrospective cohort comparison of patients with matched versus mixed manufacturer components. Collected covariates included age, sex, body mass index, Charlson comorbidity index, and year of procedure. A total of 434,985 cases were identified, including 413,607 (95%) in the matched group and 21,378 (5%) in the mixed cohort. Differences between the two groups were tested using Chi-Square, student t-test and Wilcoxon Rank Sum Test as appropriate. The unadjusted and adjusted risk of all-cause revision, revision for aseptic loosening and revision for infection were modeled with cause-specific Cox models. Hazard ratios with their 95% confidence interval were calculated, and cumulative incidence function curves by group were created to demonstrate the estimated outcome incidence in the presence of competing risk. Significance was evaluated at a level of 0.05.

RESULTS:

The prevalence of mixing THA components increased over time from less than 2% of cases in 2012 to nearly 17% in 2021 (p<0.001; Figure 1). Dual mobility bearing was more common in the mixed cohort compared to the matched cohort (27%, 4,956 vs 7%, 24,631; p<0.001; Table 1). Chen Type 8 femoral stem design (i.e., triple-taper geometry) was also more common in the mixed cohort (18%, 7,185 vs 9%, 27,987; p<0.001). Regarding femoral head sizes, the mixed cohort less commonly had a 32 mm head (18%, 2,796 vs 25%, 92,396) but more often had a 36 mm head (72%, 11,300 vs 65%, 234,776: p<0.001: Table 1). After controlling for potentially confounding variables, there was no difference in the hazard ratios of the two groups in terms of all-cause revision (OR 1.0, 95% Cl 0.9 to 1.1), revision for aseptic loosening (HR 1.2, 95% CI 0.9 to 1.6), and revision for infection (HR 1.2, 95% CI 0.9 to 1.4) (Table 2). There is no difference in revision free survival time between groups. (Figure 2).

DISCUSSION AND CONCLUSION:

There is an increasing trend of mixing manufacturer components in primary THA. Factors driving this trend appear to include integration of dual mobility bearings, femoral stems with triple-taper geometry, and achieving larger femoral head sizes. Risk of all-cause revision, or revision due to aseptic loosening or infection at minimum of two-years do not differ between mixed manufacturer





matched



components.

